

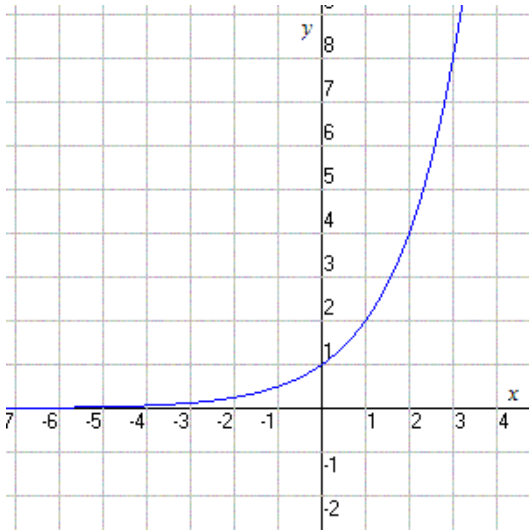
Name: _____

Period: _____

Mod 2 Test Review

- (a) Determine whether the following are linear, exponential, or neither.
 (b) Determine whether each relationship is continuous or discrete
 (c) Determine the domain and write it in set notation

1.



Exponential, Continuous,
 $\{x | x \in \mathbb{R}\}$

2.

Rounds	1	2	3	4	5
Number of players left	64	32	16	8	4

Exponential, Discrete, $\{x | x \in \mathbb{N}\}$

3. $f(x) = 2(5)^x$

Exponential, Cont., $\{x | x \in \mathbb{R}\}$

4. $f(x) = 4x + 3$

Linear, Cont., $\{x | x \in \mathbb{R}\}$

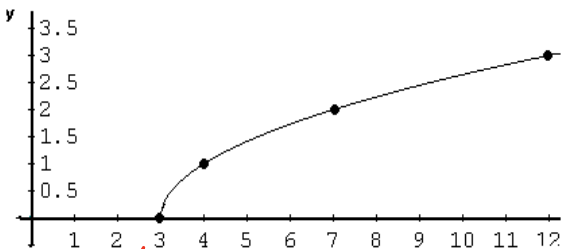
5.

x	f(x)
3	-9
-7	-7
-2	-8
13	-11

$$\begin{array}{r|l} +5 & -7 \\ +5 & -2 \\ +10 & 3 \\ \hline & -11 \end{array} \begin{array}{l} -1 \\ -1 \\ -2 \end{array}$$

Linear
 Cont.
 $\{x | x \in \mathbb{R}\}$

6.



Neither, Cont., $\{x | x \in \mathbb{R}\}$

7.

x	f(x)
1	3
2	6
6	96
8	384

$$\begin{array}{l} +1(3) \\ +4(6) \\ +2(96) \end{array} \begin{array}{l} (2) \\ (16) = 2 \cdot 2 \cdot 2 \cdot 2 \\ (4) = 2 \cdot 2 \end{array}$$

Exp.
 Cont.
 $\{x | x \in \mathbb{R}\}$

8. A water purification plant just installed a new pump that cleanses 4 gallons of water per minute. Suppose the plant already had 500 gallons of pure water when they replaced the pump and that the pump runs all day every day.

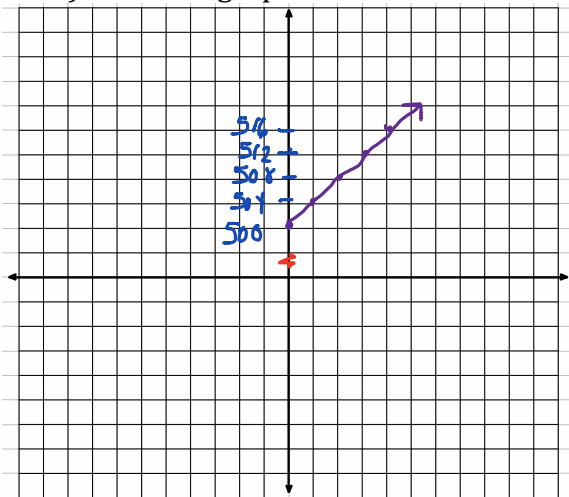
a) Create a table

x	f(x)
0	500
1	504
2	508
3	512

Name: _____

Period: _____

b) Create a graph



c) Create an explicit function

$$f(x) = 500 + 4x$$

d) Explain each piece of your function in part (c)

$f(x) \Rightarrow$ Total water cleansed
 $4 \rightarrow$ Slope or rate of water cleansed per minute
 $500 \rightarrow$ Gallons started with
 $x =$ minutes

e) Is the relationship linear or exponential?

f) Is the relationship discrete or continuous?

g) Is the relationship a sequence? Why or why not? If so, what type?

No, because it's continuous.

9. A sequence that starts with 2 and has a constant ratio that increases by 75% each term.

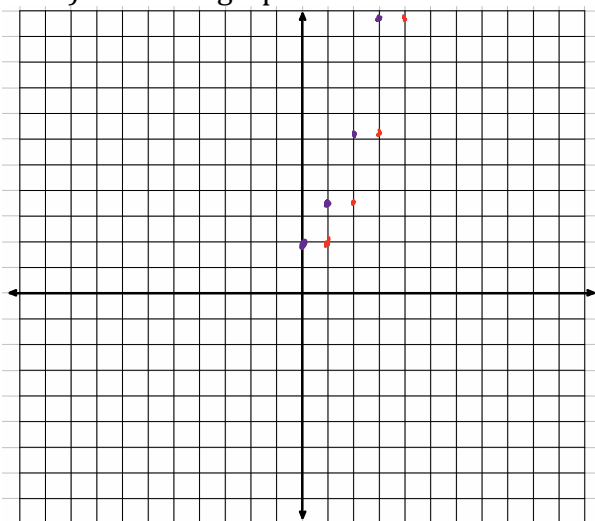
a) Create a table

x	f(x)
0	2
1	3.5
2	6.125
3	10.71875

or

1	2
2	3.5
3	6.125
4	10.71875

b) Create a graph



In a sequence we should start with the first term so the second table is more correct.

Name: _____

Period: _____

c) Create an explicit function

$f(n) = 2 \cdot 1.75^x$ or $f(n) = 2 \cdot 1.75^{x-1}$

d) Explain each piece of your function in part (c)

2 → 1st term
1.75 → constant ratio
x → term number

e) Is the relationship linear or exponential?

Exponential

f) Is the relationship discrete or continuous?

Discrete

g) What type of sequence is the relationship above?

Geometric

Determine whether the following relationships are linear, exponential, or neither. State the slope if linear or constant ratio if exponential.

10. $y = \frac{3}{4}x + 5$

Linear $m = \frac{3}{4}$

16. $f(0) = 2, f(n) = f(n-1) \cdot 5$

Exp. ratio = 5

11. $2x + 5y = 10$

Linear $m = -\frac{2}{5}$

17. $y - 7 = 3(x - 2)$

Linear $m = 3$

12. $y = 2 \cdot 5^x$

Exp. $r = 5$

18. $f(0) = 2, f(n) = f(n-1) - \frac{2}{5}$

Linear $m = -\frac{2}{5}$

13. $f(x) = 3 \cdot 4^{x-1}$

Exp. $r = 4$

19. $y = -2x + 6$

Linear $m = -2$

14. $6x + 3y = 18$

Linear $m = -2$

20. $y - 8 = \frac{3}{4}(x - 4)$

Linear $m = \frac{3}{4}$

15. $f(x) = 3x + 1$

Linear $m = 3$

21. $f(x) = x^3$

Neither

22. What are the requirements for a relationship to be a sequence?

- Pattern
 - Domain in the \mathbb{N}
 - Discrete
- Remember: Recursive is only used for sequences.

23. Determine whether the following relationships are sequences or not. If so, state what type.

(a)

x	F(x)
-2	3
-1	5
0	7
1	9
...	...

No, because there are negative x's and the domain for a sequence is always \mathbb{N} . (natural numbers)

(b)

x	F(x)
0	3
0.5	8
1	13
1.5	18
...	...

No, because there are decimals so there wouldn't be

(c)

x	F(x)
0	3
1	12
2	21
3	30
...	...

Yes, this is a sequence. There is a pattern, the domain is in the natural numbers.

Name: _____

Period: _____

Let $f(x) = 4(6)^x$ and $g(x) = 7x - 10$

24. Is $f(x)$ linear or exponential? Create a table for $f(x)$ below:

exponential

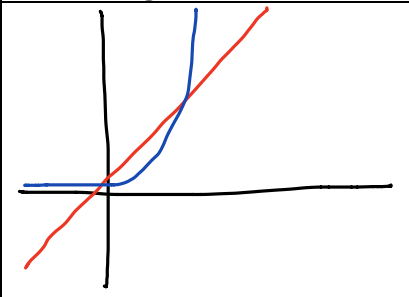
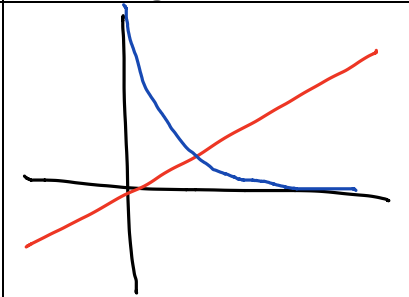
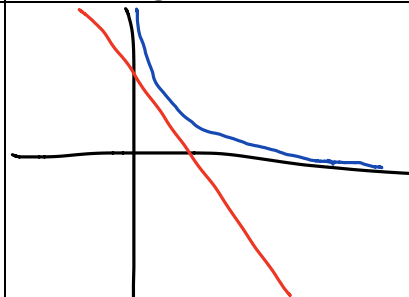
x	f(x)
0	4
1	24
2	144
3	864

25. Is $g(x)$ linear or exponential? Create a table for $g(x)$ below:

linear

x	g(x)
0	-10
1	-3
2	4
3	11

26. Create a graph that fits the following descriptions to help you answer #27 below.

(A) Create a graph with both a linear increasing function, and an exponential increasing function:	(B) Create a graph with both a linear increasing function, and an exponential decreasing function:	(A) Create a graph with both a linear decreasing function, and an exponential decreasing function:
		

Red - Linear
Blue - Expo.

27. Which relationship, out of linear or exponential, will have a greater rate of change in the long run?

If increasing, then exponential. If exponential is decreasing, then linear.

28. Determine whether the following relationships are linear, exponential, or neither.

(a)

x	f(x)
-1	2
1	4
4	6
5	8
9	10

Neither

(b)

x	f(x)
0	3
1	6
3	24
7	384
9	1536

$2 = \sqrt{4} = \sqrt[4]{16} = \sqrt{4}$
Exponential

(c)

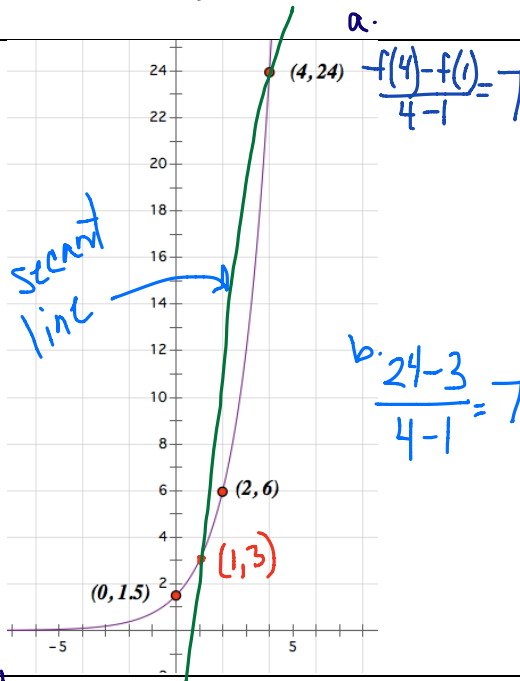
x	f(x)
0	-6
1	-12
2	-24
4	-48
6	-96

Neither

If you want bonus on the test, think about these...

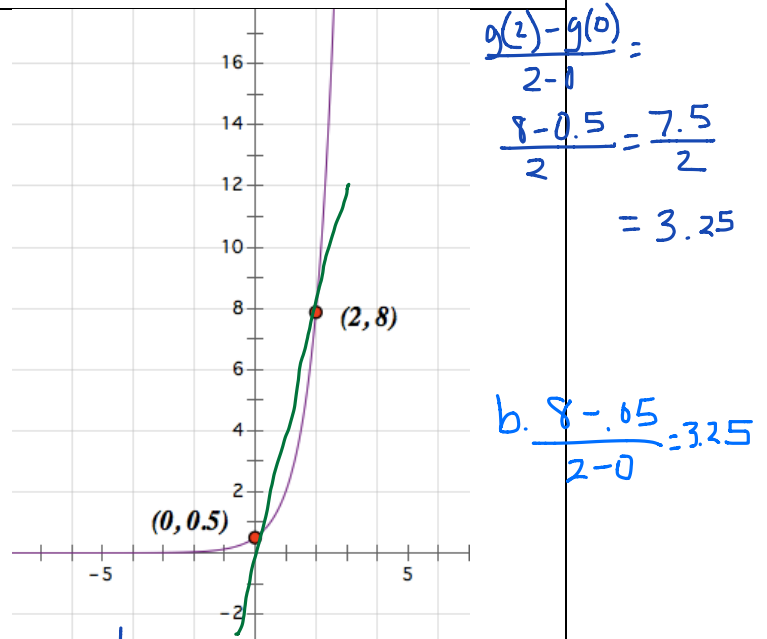
29. Write the equation of $f(x)$ shown in the graph below.

- a) Then find the average rate of change of $f(x)$ when x is between 1 and 4.
- b) Draw in the secant line (the line that you are finding the slope of when x is between 1 and 4).



30. Write the equation of $g(x)$ shown in the graph below.

- a) Then find the average rate of change of $g(x)$ when x is between 0 and 2.
- b) Draw the secant line (the line that you are finding the slope of when x is between 0 and 2).



31. Let $h(x) = 3 \cdot 7^x$. Find the average rate of change of $h(x)$ when x is between -1 and 5.

Handwritten work for $h(x) = 3 \cdot 7^x$:
 $f(5) = 3 \cdot 7^5 = 50421 \frac{3}{7}$
 $f(-1) = \frac{3}{7}$
 $\frac{50421 \frac{3}{7} - \frac{3}{7}}{5 - (-1)} = 8403.43$

Handwritten work for $h(x) = 8 \cdot 4^{x-2}$:
 $\sqrt[2]{\frac{2}{4} \frac{16}{24}} \rightarrow (4) \sqrt{4} = 2 \quad f(x) = 6 \cdot 2^{x-2} \text{ or } f(x) = 1.5 \cdot 2^x$
 $\sqrt[2]{\frac{0}{2} \frac{5}{8} \frac{16}{8}} \rightarrow (6) \sqrt{6} = 4 \quad f(x) = .5(4^x) \text{ or } f(x) = 8 \cdot 4^{x-2}$